



(12) **EUROPEAN PATENT APPLICATION**

(88) Date of publication A3:
17.03.1999 Bulletin 1999/11

(51) Int. Cl. 6: **B41J 2/07**, B41J 2/005,
B41J 2/06

(43) Date of publication A2:
18.03.1998 Bulletin 1998/12

(21) Application number: **97307097.2**

(22) Date of filing: **12.09.1997**

(84) Designated Contracting States:
**AT BE CH DE DK ES FI FR GB GR IE IT LI LU MC
NL PT SE**

(30) Priority: **13.09.1996 JP 243805/96**

(71) Applicant: **SEIKO INSTRUMENTS INC.**
Chiba-shi, Chiba 261 (JP)

(72) Inventors:
• **Oohama, Satoshi**
Mihama-ku, Chiba-shi, Chiba (JP)
• **Kawawada, Naoki**
Mihama-ku, Chiba-shi, Chiba (JP)

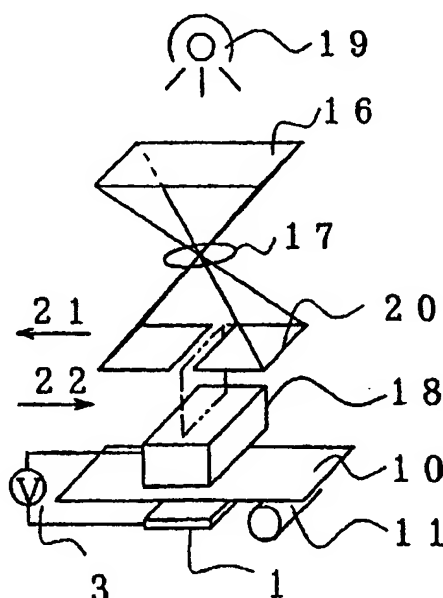
• **Iwaki, Tadao**
Mihama-ku, Chiba-shi, Chiba (JP)
• **Sato, Tatsuru**
Mihama-ku, Chiba-shi, Chiba (JP)
• **Kawaguchi, Kouji**
Mihama-ku, Chiba-shi, Chiba (JP)
• **Kuwabara, Seiji**
Mihama-ku, Chiba-shi, Chiba (JP)
• **Okano, Hiroshi**
Mihama-ku, Chiba-shi, Chiba (JP)

(74) Representative: **Sturt, Clifford Mark et al**
Miller Sturt Kenyon
9 John Street
London WC1N 2ES (GB)

(54) **Ink jet recording apparatus**

(57) In color copying systems based on a conventional electrophotographic technology, it is difficult to reduce the physical size of equipment because there are so many processing steps in printing operation. In addition, image misalignment and mixing of different colors can occur because the different colors are overlaid with one another on a single photosensitive drum. Although the problems of the electrophotographic technology may potentially be solved by ink-jet recording technology, in which ink is squirted without mechanical contact, it is difficult to improve image resolution and achieve high speed recording because a nozzle is used for squirting ink. A recording system of the present invention employs a recording unit which comprises original image illuminating means (19) for projecting light on an original (16) to form an original image, optical means, and a print head (18) which squirts ink when exposed to light, wherein the optical means guides the light incident from the original image illuminating means (19) onto the print head. The recording system thus constructed enables high-definition and high-quality image reproduction.

FIG. 7





European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 97 30 7097

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
Y	EP 0 241 118 A (OLIVETTI & CO SPA) 14 October 1987 * abstract; figures 6,7 *	1,2	B41J2/07 B41J2/005 B41J2/06
A	---	4,10	
Y	EP 0 700 787 A (SONY CORP) 13 March 1996 * column 9, line 56 - column 10, line 5; figure 1 * * abstract *	1,2	
A	---	3,5,9,10	
A	US 4 810 614 A (SANGYOJI KAZUO ET AL) 7 March 1989 * column 3, line 57 - column 5, line 17; figures 1-3 * * column 14, line 33 - column 15, line 40; figure 12 *	1,2,6,7,10	
A	PATENT ABSTRACTS OF JAPAN vol. 008, no. 058 (P-261), 16 March 1984 & JP 58 207058 A (YOKOGAWA DENKI SEISAKUSHO KK), 2 December 1983 * abstract *	1,2,10	TECHNICAL FIELDS SEARCHED (Int.Cl.6) B41J
A	US 3 484 162 A (CLARK HAROLD E) 16 December 1969 * column 2, line 71 - column 3, line 35; figure 2 *	1,2,9,10	
A	PATENT ABSTRACTS OF JAPAN vol. 014, no. 159 (M-0956), 28 March 1990 & JP 02 022065 A (SEIKO EPSON CORP), 24 January 1990 * abstract *	1,2,9,10	

-/-			
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 15 January 1999	Examiner Adam, E
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons A : member of the same patent family, corresponding document	

EPO FORM 1503 (03.92) (P4001)



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 97 30 7097

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cls)
A	PATENT ABSTRACTS OF JAPAN vol. 007, no. 177 (M-233), 5 August 1983 & JP 58 081171 A (RICOH KK), 16 May 1983 * abstract *		
A	PATENT ABSTRACTS OF JAPAN vol. 011, no. 391 (P-649), 22 December 1987 & JP 62 156674 A (SEIKOSHA CO LTD), 11 July 1987 * abstract *		
A	US 4 321 627 A (HOOKER III ROSS B ET AL) 23 March 1982		
A	US 4 794 463 A (TAMURA SAKAE ET AL) 27 December 1988		
A	PATENT ABSTRACTS OF JAPAN vol. 017, no. 623 (M-1511), 17 November 1993 & JP 05 193135 A (OLYMPUS OPTICAL CO LTD), 3 August 1993 * abstract *		TECHNICAL FIELDS SEARCHED (Int.Cl.8)
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 15 January 1999	Examiner Adam, E
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document</p>			

EPO FORM 1503 03/92 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 97 30 7097

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

15-01-1999

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 0241118	A	14-10-1987	JP 62294375 A	21-12-1987
EP 0700787	A	13-03-1996	JP 8080608 A	26-03-1996
			DE 69505918 D	17-12-1998
			US 5847732 A	08-12-1998
US 4810614	A	07-03-1989	JP 62269944 A	24-11-1987
			JP 62269560 A	24-11-1987
			JP 2099669 C	22-10-1996
			JP 8020786 B	04-03-1996
			JP 62269972 A	24-11-1987
			JP 62269961 A	24-11-1987
			JP 63038973 A	19-02-1988
			JP 63131145 A	03-06-1988
			DE 3716540 A	26-11-1987
			FR 2598828 A	20-11-1987
			GB 2190759 A, B	25-11-1987
			US 4851881 A	25-07-1989
			US 4920374 A	24-04-1990
			US 4992822 A	12-02-1991
US 3484162	A	16-12-1969	CH 472710 A	15-05-1969
			DE 1497109 A	29-05-1969
			GB 1086197 A	
			NL 6411249 A, B	05-04-1965
			SE 331032 B	07-12-1970
US 4321627	A	23-03-1982	CA 1162290 A	14-02-1984
			JP 56046761 A	28-04-1981
US 4794463	A	27-12-1988	JP 1008050 A	12-01-1989
			JP 2602817 B	23-04-1997
			JP 63120658 A	25-05-1988
			EP 0267782 A	18-05-1988
			JP 1077550 A	23-03-1989

EPO FORM P0468

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82